

Prediction of wind pressure coefficients on high-rise building façade using LSTM RNN model for sensor reduction

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ABSTRACT

As the overcrowding of the city center accelerates, skyscrapers are emerging as an alternative. Wind load is one of the main components of lateral loads on high-rise buildings. According to KBC 2016, wind load in the along-wind direction for the design of main wind force resisting system is calculated by multiplication of gust effect factor, velocity pressure, wind pressure coefficient, and area of the wall. Recently, the accurate prediction of wind pressures on the building façade is very important as the venturi effect is becoming significant in Korea.

In this study, Long Short Term Memory Recurrent Neural Network (LSTM RNN) is used, which is a deep learning model adaptable for predicting time-series data. The LSTM is also far less restrictive on gradient vanishing problem than conventional RNN model. This research aims to reduce the number of sensors by predicting the wind pressure coefficients with wind tunnel experimental data.

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